UN environment programme

CTCN
UN Climate Technology Centre & Network

Digitalization

ENABLING SYSTEMS TRANSFORMATIONS THROUGH DIGITALIZATION IN CLIMATE TECHNOLOGY AND POLICY

CTCN works with developing countries to accelerate, develop and transfer technologies for low carbon, climate resilient development.

Digitalization and climate change

Digital technologies have the potential to mitigate and help adapt to climate change, playing an increasingly significant role in every sector, from energy generation, distribution and consumption, to transport and agriculture, in which digitalization is becoming essential to transition to smart and climate resilient practices.

The UN Climate Technology Centre and Network (CTCN) recognizes digitalization as a key enabler for climate action, CTCN facilitates the deployment of innovative and sustainable digital technologies across all sectors to support climate action in developing countries. Digitalization is needed from initial design through financing of climate action.

CTCN case studies, pilot projects, RD&D, and concept notes can be leveraged/are pivotal to attract investments and funds.
CTCN collaborates with The Green Climate Fund, The Global Environmental Facility, The Adaptation Fund Climate Innovation Accelerator, and several regional and national development banks, supporting systems transformation in over 30 countries.

CTCN strengthens:

- Development and piloting
- Capacity building and training
- Creating an enabling environment through technology assessment
- Policy development
- Financing mechanisms

CTCN strengthens the digitalization capacity and ecosystem of developing countries

For over a decade, CTCN has worked with National Designated Entities (NDEs)[1] and over 900 Network members,[2] to provide technical assistance, capacity-building and knowledge-sharing to assist the development of Digitization. This includes:

39 technical assistances involving and/or developing digital technologies

Over **US$6 million** invested into digital technology projects

18 digital tools developed or improved, including:

- Early warning technologies (Thailand, Dominican Republic)
- Agrometeorological information systems (Mali)
- Ecosystem monitoring tools, and real-time transportation information systems (Bangladesh)

33 countries where CTCN has harnessed digital technologies for climate action

24 technical assistances provided training on digital technologies:

- Drought risk modelling (Saint Kitts and Nevis)
- Drone-enabled remote sensing of forests (Eswatini)
- GIS-based monitoring for water loss reduction (Granada)
- Demand response measures in the energy sector (South Africa)

Malawi: using mobile technology to strengthen climate resilience

Agriculture and water resources in Malawi are under increasing threat from frequent extreme weather events such as floods and droughts.

These hazards disrupt livelihoods, reduce crop yields, and challenge disaster preparedness. Enhancing climate data collection and information services has become critical to help communities adapt, secure food, and manage water sustainably.

Accurate climate information can mean the difference between resilience and vulnerability, between protecting livelihoods or losing them.

With support from CTCN through the Adaptation Fund Climate Innovation Accelerator (AFCIA), Malawi is scaling up the use of simple mobile technologies to strengthen climate observations and adaptation. The project converges mobile, cloud, and AI tools to collect, digitize, and analyze climate data—helping to improve forecasts and adaptation planning.

The project offers:

- **Mobile-based data collection** via free SMS and WhatsApp from remote areas
- **Cloud databases and AI tools** to process and analyze climate information for better insights
- **Integration with national systems** to strengthen Malawi's hydrometric and meteorological networks
- **Training and capacity-building** for communities, experts, and institutions (470 beneficiaries, 35% of direct beneficiaries are women)
- **Improved agricultural and water planning** through more reliable weather forecasts and early warning systems
- **Support for disaster risk management** with stronger forecasting and impact modeling

By ensuring affordability and ease of use, the project demonstrates strong potential for replication across other regions facing climate stress.

> “We’ve always known that water is our most precious resource. Now, we understand how to make the most of what we have.”
>
> *Dawood Hassan, farmer in the Maldives*

CTCN for inclusive digitalization

To close the digitalization gap and ensure developing countries can benefit from digital technologies for climate action, while also ensuring that the deployment of these technologies is sustainable, equitable and effective, CTCN is delivering an extensive portfolio of capacity building activities focusing on digitalization, including:

- A global capacity building programme on AI for climate action to increase the awareness of opportunities and challenges of AI for mitigating and adapting to climate change amongst climate change professionals.
- The Youth Climate Innovation Programme designed to support young innovators from developing countries as they create, develop, and scale high-impact climate technology solutions. It has trained more than 650 young entrepreneurs and incubated more than 60 startups so far.

CTCN works with various constituencies under the UNFCCC, including youth, women and indigenous communities, to ensure the socio-economic benefits of digitalization, which contributes to economic growth, job creation, improved livelihoods, support for entrepreneurs, and improvements to gender equality, particularly in the most vulnerable communities.

CTCN for inclusive digitalization	Countries Outcome	Impacts
Exploring emerging digital technologies and piloting digital tools: CTCN supports countries in exploring the climate potential of emerging technologies such as artificial intelligence, blockchain, Internet of Things, cloud computing and open data, and developing and piloting locally-adapted digital solutions to drive climate adaptation and increase resilience in communities.	Cambodia	Climate risk assessment for subnational adaptation and establishment of a local climate information system (LISA) for climate change adaptation
	Grenada	Improvement of water supply management in Grenada through GIS-based monitoring and control system for water loss reduction
	Georgia	Building up integrated monitoring and early warning forest fires detection system in the Borjomi - Kharagauli National Park by innovative remote sensing tools
	Nepal	Customized weather and climate information system for climate-resilient agriculture
	Samoa	Development of a framework and methodology to carbon sinks from the forestry sector using Earth observation
	South Africa	Tree Monitoring for Climate Adaptation in the City of Mbombela
	Sudan	Soil erosion valuation to support climate resilient agriculture and food security

Next-generation digitalization

The next generation of digitalization for climate action in developing countries will require a sustainable and ethical approach that considers the potential of digital technologies to contribute to climate mitigation and adaptation as well as their environmental and social risks, challenges and opportunities for the most vulnerable communities. It will also require partnerships between technology providers, financing institutions, governments, and civil society to ensure that digital solutions are deployed effectively and equitably.

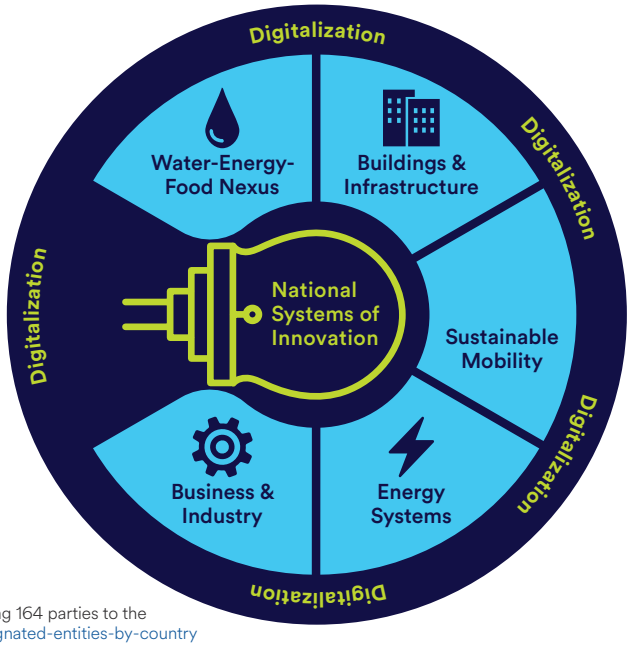
Moving forward the CTCN will prioritize:

- **Advanced analytics (e.g. AI, machine learning, cloud computing)** to optimize energy use, run climate models, and inform mitigation and adaptation strategies.
- **Secure digital systems (e.g. blockchain)** to enable transparent climate transactions, such as for insurance and decentralized energy trading.
- **Connected devices (IoT)** to manage irrigation, monitor environmental conditions, and improve resource efficiency.
- **Open data and platforms** to support knowledge sharing, innovation, and collaboration on climate action.
- **Accessible digital tools (e.g. mobile technology, SMS, citizen science)** to deliver climate information to communities, enable local data collection, and strengthen resilience in areas with limited connectivity.

About CTCN

The Climate Technology Centre and Network (the implementation arm of UNFCCC's Climate Change Technology Mechanism, mandated under the Paris Agreement) provides accelerated development and transfer of environmentally sound technologies for low carbon and climate resilient development at the request of developing countries.

CTCN provides a portfolio of technology solutions, capacity building and advice on policy, legal and regulatory frameworks tailored to the needs of individual countries by harnessing the expertise of a global network of technology companies and institutions. CTCN is hosted by the UN Environment Programme and is headquartered in Copenhagen, Denmark.



1 NDEs are technology representatives selected by each country's government representing 164 parties to the UNFCCC https://www.ctc-n.org/about-ctcn/national-designated-entities/national-designated-entities-by-country

2 CTCN's Network includes members from: National technology and regional climate technology centres, intergovernmental, international, regional or sector organization, research, financial, non- governmental, industry, SMEs, and private sector organizations.

3 To unlock a more equitable world, a global effort is needed to encourage and invest in the creation of digital public goods: open-source software, open data, open artificial intelligence models, open standards and open content. This is key to achieving the Sustainable Development Goals. Digital public goods should adhere to privacy and other applicable laws, standards and best practices, do no harm. The *UN Road map for digital cooperation* particularly highlights the role played by the Digital Public Goods Alliance, which was established in response to the High-Level Panel's recommendation on Digital Public Goods, and with which the Office works closely.

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Become a CTCN member, join a community of global innovators and leaders for climate action, scan the QR code.